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Effects of memory organization on credit assignment in human reinforcement learning

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Abstract

How does the similarity structure of memory influence credit assignment in reinforcement learning? Memory spaces vary in how integrated versus separable their constituent dimensions are, and how clustered versus distributed items are across dimensions. Greater integration may cause people to overattribute value to multiple dimensions, potentially leading to generalization errors. Greater clustering may bias people to attribute value to discrete category-centers (category-based learning) rather than map value continuously across the space (function learning). In this study, subjects complete a value-learning task in which stimuli are sampled from low-dimensional perceptual spaces, and reward is mapped to one dimension. Each space is intended to engender a different degree of integration and clustering in memory, such that effects of memory organization on learning can be probed. Additionally, we investigate how credit assignment on each of these artificial perceptual spaces differs to credit assignment on more complex spaces that define real-world semantic concepts.